

CLAIMS

1. A circuit for realizing a non-linear reactive elements scale network, comprising:
a plurality of non-linear elements of the network acting as inductive and capacitive components cascade connected between a pair of input terminals and a pair of output terminals, characterized in that each component of the network being formed by cascade connecting a first and a second transconductance integrator with each other.
2. The circuit according to claim 1 wherein each integrator comprises a bipolar transistor input circuit portion and a MOS transistor bias circuit portion, and that the outputs of the second integrator are feedback connected to the bias circuit portion of the same integrator through a feedback block.
3. The circuit according to claim 2 wherein said feedback block provides a voltage reference for said bias circuit portion.
4. The circuit according to claim 1 wherein the outputs of the first integrator connected to the inputs of the second integrator are further coupled to ground by respective diodes.
5. The circuit according to claim 1 wherein it comprises differential outputs respectively coupled to ground through a stabilization capacitance.
6. The circuit according to claim 1 wherein the first and the second integrator have the same transconductance.

7. The circuit according to claim 1 wherein each pair of integrators implements the following equation, in order to emulate a capacitor, or a similar equation with L indexes in order to emulate an inductor:

$$I_c = \frac{C_0}{1 + \left(\frac{V_c}{V_0}\right)^2} \frac{\partial V_c}{\partial t} \Rightarrow \frac{1}{C_0} \int I_c \left[1 + \left(\frac{V_c}{V_0}\right)^2 \right] dt = V_c \quad (4)$$

8. The circuit according to claim 1, wherein the plurality comprises at least twenty inductive and capacitive components.

9. A circuit, comprising:

a circuit input;

a plurality of non-linear inductor simulation components, each having an input and an output, the input of the non-linear inductor simulation components being coupled to the circuit input;

a plurality of non-linear capacitor simulation components, each having an input and an output;

a coupling from an output of at least one of the non-linear inductor simulation components to the input of at least one of the non-linear capacitor simulation components;

a coupling from an output of at least one of the non-linear capacitor simulation components to the input of at least one of the non-linear inductor simulation components; and

a circuit output coupled to the output of the non-linear capacitor simulation components.

10. The circuit according to claim 9, further including:

a common mode feedback circuit coupled to the circuit output.

11. The circuit according to claim 9, further including:
a feedback circuit coupled to the circuit output in order to provide a reference signal level for the feedback.
12. The circuit according to claim 9 wherein the circuit input is a differential input.
13. The circuit according to claim 9 wherein the inductor simulation circuit includes bipolar transistors.
14. The circuit according to claim 9 wherein the inductor simulation circuit includes MOS transistors.
15. The circuit according to claim 9, further including:
a disk drive read channel signal line coupled to the circuit input to provide data stored on a disk drive to the circuit.
16. A method of simulating a capacitive and inductor network comprising:
receiving a differential input signal at a simulated non-linear inductor circuit;
integrating the input signal to simulate a non-linear inductor and outputting the results;
receiving a differential input signal from the output of the non-linear inductor at a simulated non-linear capacitor circuit;
integrating the differential input signal to simulate a non-linear capacitor;
and
outputting the integrated capacitor signal as the output of the circuit.

17. The method according to claim 16, further including:
feeding back an output from the capacitor circuit to at least one input of
the inductor simulation circuit.

18. The method according to claim 16, further including:
receiving the input signal from a Disk drive read channel.